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OF SO-CALLED
BLEEDING POLYPUS (DISCRETE ANGEIOMA)
OF THE SEPTUM

BY

L. HEMINGTON PEGLER, M.D. EDIN.

SURGEON TO THE METROPOLITAN EAR, NOSE, AND THROAT
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THE PATHOLOGY, AFFINITIES, AND TREATMENT OF SO-CALLED BLEED- ING POLYPUS (DISCRETE ANGEIOMA) OF THE SEPTUM.¹

PART I.—CLINICAL.

1. *Introductory.*

A REMARKABLE fact in the pathology of the nasal septum is that almost every form of nasal tumour, malignant or benign, is liable to take origin from it. Of the non-malignant species, one of not uncommon occurrence is the so-called bleeding polypus of the septum, a neoplasm of considerable importance for the following reasons. 1. It may be a quite unsuspected source of epistaxis; sudden in onset, oft recurring, alarming in extent, and destructive to health by exhaustion or anæmia. 2. When discovered it may simulate, and even be mistaken for, a malignant tumour and if a portion be removed and examined under the microscope its true character may still be misunderstood owing to the equivocal appearance which its rapidly growing tissues may present to the observer, either in part or throughout. 3. These tissues not infrequently bear relationship histologically to the intimate structure of bulky vascular nasal growths that exhibit certain characters in common with malignant tumours (always excepting metastasis), and involve serious operations for their removal. 4. Clinically, it shows a strong tendency to recrudescence after excision unless this has been radically carried out.

The object of this communication is to supplement the investigations that have so far been made upon these growths and to lay before the profession in a concentrated

¹ The numerals in italics which are inserted parenthetically throughout the text refer to the chronologically-arranged bibliography at the end of the paper. The numbers associated with the descriptions of the figures refer to the tables.

form the valuable material that has reached it hitherto sporadically and almost solely through the medium of scattered papers in certain special societies' proceedings in London and abroad. As curator of the Laryngological Society's pathological collection I have had the privilege of examining not only many specimens of bleeding polypus, but, what is very important, their pathological relationship to kindred neoplasms invading the nose and other organs. Such means assist the inquirer very greatly towards a knowledge of the true affinities of these little tumours and the correct interpretation of atypical examples, especially when studied in conjunction with their clinical history. Furthermore, the literature of this subject discloses considerable diversity of opinion as to the result of both pathological and clinical observation; there is consequently some scope for the critical investigator to assimilate the accumulated facts and deduce from them such concrete information as should be useful and acceptable, not only to the student of rhinology, but also to the general practitioner. The possibility of having to deal with an intractable epistaxis of unsuspected origin and such as might draw upon his resources both in diagnosis and treatment is certainly worth the practitioner's consideration.

It has been commonly stated that bleeding polypus of the septum is of rare occurrence. This, however, can hardly be the case; examples appear not infrequently at the various London clinics and many have never been recorded. Doubtless this is equally true of the foreign clinics, although so many have been described.

2. *Nomenclature.*

The neoplasm under discussion may for practical purposes be considered as a species of benign tumour (a term which here and elsewhere in this paper is used rather in a conventional than in a strictly pathological sense), almost limited to the nasal septum, and following a fairly well-defined type. It is known by the Germans as "blutende septum polyp," by the French as "polype saignant de la cloison," and by ourselves as "bleeding polypus of the septum." This designation, originated by Schadowaldt (6) in 1893, has been accepted in this country and abroad, and although it has been adversely criticised by Fraenkel, Grünwald, and others, it is supported by Hasslauer and many recent writers who clearly regard a popular title as valuable if, having gained general acceptance, it conveys a definite meaning, even though it may not be strictly accurate in a scientific sense. As, therefore, it represents in this instance a congeries or group for which a single yet comprehensive title sufficiently accurate in a pathological sense is extremely difficult to invent in the present state of our knowledge, the clinically useful term "bleeding

polypus of the septum" will be adopted in this paper. The principal objections to be raised against the term are (1) that bleeding tumours of a very different nature may occur in the same situation (Grünwald) (21); (2) that bleeding is not a sufficiently constant symptom; and (3) that the use of the term polypus may lead to confusion with common mucous polypus from which it is structurally dissimilar. In reply it may be argued (1) that no other polypoid tumour clinically resembling this growth and arising from the septum nasi is equally vascular; (2) that severe bleeding is an almost constant antecedent symptom (Alexander has, I believe, recorded the principal exception—it was probably very largely fibromatous); and (3) that with the word "bleeding" in association, confusion need not arise with the common mucous polypus; if so the additional qualification "of the septum" should prevent it.

The greater number of growths arising from the vestibular floor or ala are angeiomatous and fall into the same category, but neither of these sites corresponds with that of the common mucous polypus. Nevertheless, bleeding polypus of the septum being in a certain proportion of the recorded cases "a pyriform, pendulous, and pedunculated tumour growing from mucous membrane," falls equally under Hamilton's definition of a polypus.² Krieg (20) has observed bleeding polypus of the septum occurring coincidently with common mucous polypus in the nasal cavity. Such being, however, the common acceptation of the term I think it most important to restrict it to the benign growths so named and most carefully figured by Krieg and Gerber (20) in their recent atlases, and also illustrated in this paper. To comprehend within it any kind of malignant tumour, so as to say with one author that "sarcoma nasi constitutes one of the forms of bleeding polypus of the septum," must lead to confusion and negative its most useful application. As a more technical synonym I would suggest that the leading features of benignity, vascularity, succinctness of growth, and prevailing site might be conveniently and sufficiently indicated by some brief title such as "discrete angioma of the septum," which accordingly I have provisionally adopted.

3. *Etiology.*

The etiology of bleeding polypus is somewhat unsettled. The tumour is not generally considered to have been observed in any but the fully developed condition, the commencing stage not having been differentiated with certainty (Hasslauer). Krieg, on the other hand, figures in his atlas a small conical papilla of granulations associated with a branch of Kiesselbach's artery which he regards as a minute commencing bleeding polypus. He maintains that in all his

² Text-book of Pathology.

cases (nine in number) a bleeding vessel could be looked upon as the direct exciting cause, "the tumour always growing from a base formed by blood-vessels proliferating in consequence of inflammation, no matter whether from a single dilated vessel or from a patch of mucosa which was granulating or had undergone cavernous degeneration." Krieg, following Siebenmann and Ribary (23), traces the growth, in fact, to rhinitis sicca, which in his view may terminate either in cicatrisation, perforative ulcer (destruction), or proliferation of tissue (bleeding polypus). In this hypothesis he seems to be supported by Zuckerkandl, Grünwald, and others; Biehl (18) identified varix of the septal vessels with the early stage of bleeding polypus. The influence of traumatism has been much discussed, particularly owing to the fact that Kicsselbach's area is within easy reach of mechanical injury. Combined with pre-existing rhinitis sicca, traumatic hæmorrhages under the surface would lead to erosions or necrosis with formation of cavernous cavities from which a granuloma might arise. It may be well to remark here that rhinitis sicca is a dry form of chronic inflammation of the nasal mucous membrane accompanied by tendency to crusting without fœtor and to hæmorrhage; it is often associated with chronic alcoholism. Krieg and his *confrères* have the evidence of histology in their favour in a certain proportion of cases—those, namely, in which the tumours are inflammatory and granulomatous in character; his theory, however, does not admit of universal application, as he himself recognises. Similar tumours arise from the vestibule, and closely allied ones from the inferior turbinal, the septum itself being healthy, and in the London cases note has been taken of the absence of any general affection of the mucous membrane. Such laryngeal angiо-fibromas as agree in the main with septal angiomas (bleeding polypus) are not necessarily associated with laryngitis sicca; corresponding growths in the aural meatus have also a different starting point. Other writers attribute the origin of bleeding polypus to some disturbance in the process of nutrition of the vessel walls producing dilatation of their lumina (Bosworth). Schadowaldt (6), followed by Baurowicz (23), has maintained that there is a greater proclivity for the affection amongst the female sex and that the tumour is especially liable to arise during pregnancy. This belief has not gained general acceptance.

4. *Clinical Features.*

Naked-eye appearance.—A roundish or ovoid body, red, dark red, or bluish in colour, varying in size from that of a small pea to that of a hazel nut, lobulated like a raspberry or nearly smooth on the surface and more or less mobile, is seen to occupy or to occlude the nasal chamber or vestibular cavity (Fig. 1). Examined with the probe

a pedicle varying very much in length and circumference is usually found to connect the growth with its base; if the pedicle is very short and thick the tumour may assume a flattened or mushroom shape. A grey sloughy surface on exposed aspects is not uncommon, indicating an early stage of ulceration or replacement of epithelium by coagulum. Pulsation has been spoken of, especially when the growth is of a bright-red colour, and hence inferred to arise from an artery; but I wish to emphasise the fact that this symptom, with the exception of Verneuil's case (1) has not been noted in clinical reports.

FIG. 1.



Naked-eye appearance of Dr. Scanes Spicer's case (No. 12).
(Drawn for the author by Dr. Smurthwaite.)

Site.—The seat of election of this particular tumour is Kiesselbach's area—i.e., that part of the surface of the triangular cartilage opposite the anterior end of the inferior turbinal and just behind the inner fold of the limen vestibuli. This site corresponds very closely with the ultimate distribution of Kiesselbach's artery, a twig of which through rupture or diapedesis is the commonest source of nose bleeding; here, too, occur simple erosion and perforating ulcer of the triangular cartilage, a fact which is certainly more than a mere coincidence. The next most common situation is further back at a higher elevation, about the junction of the triangular cartilage with the perpendicular plate of the ethmoid. Lange has attempted to demonstrate a preference for the left side of the nose, though Hasslauer has shown that this observation has not stood the test of subsequent experience.

5. *Symptoms.*

The patient's attention is usually first attracted by an attack of nose bleeding, often profuse from the commencement. It occurs on such slight provocation that it is liable to return at frequent intervals. There are cases of exceptional hæmorrhage depending upon the presence of ulceration, and apparently, too, upon the situation; if the attachment is low down on Kiesselbach's spot the tendency to bleeding is much greater than when higher up near the so-called tubercle. When attached to the floor or ala of the vestibule the growths are, on the whole, less hæmorrhagic. As growth proceeds a sense of obstruction is superadded which causes advice to be sought, if not already had recourse to, and the stenosis on the affected side may then become complete. The general health is not usually affected unless the bleeding is profuse; in Sendziak's case there was said to be profound anæmia. The obstruction may set up catarrhal or muco-purulent discharge and the patient's comfort is further harassed by the constant apprehension of bleeding.

The tumour is believed to be of slow development in the first instance, though after incomplete removal it reappears rapidly and may exceed its original dimensions in from two to six weeks. This is not evidence of genuine recurrence by virtue of cellular infiltration of the base but rather a regeneration of the young sprouting capillary vessels through lack of thoroughness in surgical procedure.

6. *Clinical Diagnosis.*

The differential diagnosis by the naked eye is not always an easy matter even for a surgeon accustomed to rhinoscopic examinations, owing partly to the diversity of character of bleeding polypus, and the practical impossibility of making a positive diagnosis from certain of the nasal growths till after removal and microscopic examination. If, however, the growth being near the nostril, the appearances coincide with the description already given, and the history of hæmorrhage is clear, the diagnosis should be easy. If the attachment is low down towards the floor and more or less in front distinction has to be made from lupus or tuberculous nodules, squamous papilloma, fibroma, and the various papilliform mucous hypertrophies of the septum. I place these in what I believe to be the order of greatest similarity. Lupus nodules and hard or squamous papilloma may be indistinguishable till microscopically examined. Fibroma is not usually so dark-coloured or vascular, but certain angiomatic growths are not remarkably so, either. The papilliform mucous hypertrophies, unless highly inflamed, are more pearly because very œdematous. To practitioners

in India the interesting tumours resembling the fruit of the arbutus and caused by psorospermiosis of the septal mucosa, have an additional claim on their attention as not being very di-similar in appearance to bleeding polypi, whilst occupying the same site on Kiesselbach's area.³ If the attachment of the bleeding polypus is higher up towards the region of the so-called tubercle of the septum the careful use of the probe as well as the speculum is necessary to ascertain the nature and extent of the base or pedicle. Inflamed septal polypi or a pedunculated cyst must be thought of; sarcoma and other rapidly growing malignant neoplasms soon cause complete obstruction and often set up external disfigurement. Round-cell sarcoma, the most frequent, is soft, fleshy, and often friable; if a portion be removed the tumour bleeds violently and rapidly exceeds its former mass; it never forms a succinct and pedunculated growth.⁴ A case is described in the sequel in which a granulomatous body which closely approached a bleeding polypus in naked-eye appearance created considerable external deformity as well as deflection of the septum; the difficulty in diagnosing such a case is obvious.

7. Treatment.

Treatment is best effected by removal with the cold snare, the loop being constituted of No. 5 piano wire and slowly tightened up. If the pedicle is very broad, transfixion with a needle may first be performed. The bleeding on detachment of the tumour may be alarmingly profuse, and must be controlled by pressure until the base can be thoroughly and deeply seared by the flat burner of the galvano-cautery, or curetted, after which the nasal cavity should be firmly plugged with iodoform gauze. The galvano-cautery treatment will require repetition on the first sign of recrudescence; the latter is to be regarded as an absence of complete destruction of the base rather than an actual recurrence, much less as an indication of malignancy. In Germany the chisel is often employed (Krieg) and is probably very drastic in effect. The method detailed above is, however, more in consonance with English practice.

³ See O'Kenealy's paper and drawings, Proceedings of the Laryngological Society of London, vol. xi.

⁴ See Price-Brown, Transactions of the American Laryngological Association, June 2nd, 1905.

FIG. 2.



Fibro-aneurysm of the vestibular ala. The section passes through the base, which is below. A large thin-walled sinus is seen above.

PART II.—PATHOLOGICAL.

1. *Morbid Histology.*

An absolutely satisfactory interpretation of much that the microscope reveals in these growths can hardly be hoped for until the science of general pathology has decided for us many points at present remaining *sub judice*. In order to gain a correct idea of the structure of one of these growths a longitudinal section including the pedicle and stained with hæmatoxyline and eosine should be selected for examination, using in the first instance a low magnifying power. Unfortunately, it is rarely that one is able to procure a section including any appreciable portion of the pedicle, owing to the frequency with which that structure is destroyed in course of removal by the snare. In Figs. 2 and 3 the base of the tumour, including the site of attachment of the pedicle, is seen. Fig. 2 shows the epithelium in this spot to be gathered in, or puckered, at the angle of junction, the intermediate surface being occupied by blood clot probably representing the place of entrance of the widely dilated channel, which is torn through and is presumably carrying the blood-supply. In Fig. 3 the vascular channels to be seen branching out into the tumour are emanating from the base, whilst numerous bundles of fibrous tissue, apparently continuous with those forming the pedicle, are seen to radiate in the same direction. The component parts of a section may be described in the following sequence: (1) the external envelope, (2) the vascular element, (3) the cellular element, and (4) the stroma or ground substance, 3 and 4 constituting the chief mass.

1. *The external envelope* is normally formed of squamous epithelium with a prickly cell layer but in most examples the periphery is in part denuded of epithelium altogether. The change is not abrupt as a rule, a thinning off taking place until a single layer of cells is reached, which in turn gradually disappears. This is usually at the opposite pole from the peduncle or base; the epithelium is then replaced by a fibrinous deposit inclosing red blood cells and zones of lymphocytes in various stages of disintegration, but there are instances in which the coagulum is seen enveloping a considerable depth of stratified epithelium, the cells of which appear to be undergoing absorption by polymorphonuclear leucocytes (phagocytes). In Dr. Scanes Spicer's case, No. 2 in the subjoined table, repre-

FIG. 3.



Longitudinal section of soft-cell fibro-angioma of vestibule passing through the base (pedicle). The dark areas represent the abundant cell-proliferation filling up the spaces between the divisions of the stroma. Author's case. (No. 1.)

A DESCRIPTIVE TABLE OF 16 CASES OF SO-CALLED "BLEEDING POLYPUS" OR DISCRETE ANGIOEMA OF THE SEPTUM.*

No. of Case.	Operator reference.	Sex.	Age or age at onset.	Duration and character of previous symptoms.	Situation and appearance.	Histological features.	Treatment.	Result.
1	Dr. Pegler, January, 1894.	F.	19	Six months.	Left side; floor of vestibule; sessile growth; size of small bean.	Longitudinal section of soft-cell fibro-angioma. (Fig. 3.) <i>External envelope</i> : Epithelium, stratified, with horny layer on convexity, columnar and dilated, with large channels radiating from base and several large spaces occupy the right half of section; smaller spaces and channels appear in the remainder. A large type of endothelium lines the channels and the numberless capillaries. <i>Cell element</i> : Chief mass a loose stroma of connective tissue, with cells and capillaries close up to periphery, here somewhat arranged. Coarser fibres accompany blood channels at the base. Lymphocytes generally disseminated throughout.	Snared.	No recrudescence.
2	Dr. St. John Thomson: Proceedings of the Laryngological Society of London, vol. iii, January, 1895.	M.	29	Several attacks of epistaxis.	Right side of cartilage of septum about centre attached by fairly thick pedicle; irregularly round lobulated growth.	Longitudinal section of small soft-cell three-lobed fibro-angioma. <i>Envelope</i> : Epithelium thin columnar, ciliated, thin, and scanty. <i>Vascular element</i> : Numerous channels filled with red cells form the chief open spaces of close-meshed fibro-angiomatous and capillary areas; one division has larger isolated spaces, some have cell-proliferated walls. <i>Cell element</i> : Chief mass, these angiomatous areas densely crowded with large endothelioid cells, save a clear submarginal zone, and a wide branching strands of fibrous stroma infiltrated with scattered red cells, including some of the areas; lymphocytes disseminated throughout.	Snared; base twice cauterised.	Cured.
3	Dr. R. H. Scanes Spicer: Proceedings of the Laryngological Society of London, vol. v, December, 1897.	M.	35	Epistaxis.	Right side of septal cartilage, very red, vascular growth attached by a broadish base.	Longitudinal section of two small fragments of granular fibro-angioma. <i>Envelope</i> : Epithelium; stratified except near the base disappearing beneath an acervus coagulated, partly organised blood plasma packed with blood cells. <i>Vascular element</i> : The irregular shaped spaces of the coarse fibrous stroma, the work of the basal half and the scattered spaces of the granulatous zone. <i>Cell element</i> : Chief mass, the fibrous trabecule of the base, rich in endothelioid cells, merging into a granulatous zone of loose oedematous stroma with fibroblasts, plasma cells and chains of lymphocytes, capped by exudate.	Portion removed with scissors for original examination.	Grew nearly to the original size.
4	Dr. Brown Kelly: Proceedings of the Laryngological Society of London, vol. x., February, 1903 (Case 1).	F.	31	Nine months' recurrent epistaxis; obstruction septum; remission subsequently recrudesced.	Left side of anterior a quarter of an inch above the base of the nose. Oval red fleshy growth of the size of a pea slightly indented.	Transverse section of a spongy, small - channelled angioma (Figs. 6 and 7). <i>Envelope</i> : Epithelium; stratified and squamous, sending in a prolongation across the section and three cones of horny cells. Largely denuded and replaced by fibrinous deposit. <i>Vascular element</i> : Section perforated throughout by small, roundish channels, with thin walls (some thicker) of delicate fibrils of nucleated connective tissue (stroma). Endothelial lining formed by the flattened cells of the trabeculae. Conus: Horny cells, fibrin, or a secondary nucleated reticulum. <i>Cell element</i> : Chief mass the glassy nucleated framework and channels representing fibro-angiomatous tissue and its nuclei, representing the endothelioid cells.	Snared; base destroyed by galvanocautery.	Cure.
5	Dr. Brown Kelly, same as No. 6 (Case 2).	F.	40	Eight weeks' frequent epistaxis; twice profuse.	Left side of septum near mucocutaneous junction; oval pedunculated growth of half the size of a pea.	Transverse section of loose textured fibro-angioma. <i>Envelope</i> : Epithelium thin, stratified, or only a horny layer; in one spot a nodule of squamæ, but mostly replaced by a laminated coagulum of fibrin, leucocytes and debris. <i>Vascular element</i> : Numerous scattered roundish medium-sized channels, containing red cells or fibrin with leucocytes; smaller channels form chief openings of a coarse fibro angiomatous meshwork. <i>Cell element</i> : Chief mass, loose stroma or fibrous strands including capillary areas. Submarginal zone enclosing capillary areas. Leucocytes fill up oval spaces in this zone also disseminated throughout.	Snared; base treated with galvanocautery.	Cure.
6	Dr. Brown Kelly, same as No. 6 (Case 3).	M.	17	Commenced as small pimple which became bloody; grew larger after each attack; history of digital traumatism.	Left vestibule, alar wall, anteriorly near mucocutaneous junction, filling the nostril; of size of a hazel nut.	Longitudinal section of loose-textured fibro-angioma (Fig. 2). <i>Envelope</i> : Epithelium; squamous, stratified over basal surface up to site of pedicle; elsewhere denuded or replaced by fibrinous deposit; at one spot signs of ulceration. <i>Vascular element</i> : Blood spaces and channels aggregated about the base and tending to radiate from it; a very large thin-walled blood-filled space near the centre; a smaller sinus nearer the base in which the prolongations and islets of trabecular stroma; also here a few small capillaries. Chief mass, about two-thirds, loose oedematous tissue traversed by capillaries and disseminated with leucocytes; and a deep marginal subfibrous zone of granulatous tissue.	Snared; base cauterised.	Cure.
7	Dr. Brown Kelly, same as No. 6 (Case 4).	M.	20	Frequent epistaxis; gradual increasing obstruction.	Right side of cartilaginous septum; sessile growth; upper lateral cartilage elevated; septum deflected by growth.	Transverse section (?) of portion of an atypical granulatous polypoid growth; very faintly stained. <i>Envelope</i> : Condensed layers of laminated material infiltrated in places, organised from blood clot (?); in part, blood plasma; no true epithelium. <i>Vascular element</i> : A few small vessels can be seen in cross section in a loose oedematous stroma. <i>Cell element</i> : Chief mass a nearly homogeneous congeries of faintly stained cells, including lymphocytes, and plasma cells. They occupy the full differentiated stroma of loose wavy fibrillary tissue.	Portion removed for examination only.	Patient disappeared or appeared after two years, after which only a scar (synechia) was visible; cartilage elevation and deflection had subsided.
8	Mr. Hunter Tol. Proceedings of the Laryngological Society of London, vol. x., February, 1903.	F.	33	Three months; several attacks of epistaxis.	Left side of cartilage of septum anteriorly; polypoid growth with sessile base, almost protruding from the nostril.	Transverse section of large channelled, loose-textured fibro-angioma (Fig. 9). <i>Envelope</i> : Epithelium; partly squamous with horny layer, partly ciliated and columnar; replaced in one situation by almost dense ensnaring leucocytes. <i>Vascular element</i> : Numerous large blood channels, possibly venous, having walls mostly encircled by dense interrupted fibres; the gaps indicate entrance of tributaries, lined with endothelium; numerous smaller fibrin-filled blood spaces. <i>Cell element</i> : Chief mass loose stroma traversed by young capillaries, and wide bands of coarser fibres bordering on capillary areas; these areas rich in endothelioid cells encompass most of large channels; a subfibrous granulatous zone.	Portion removed for examination; considerable hæmorrhage observed; radically removed and base cauterised.	Cure.

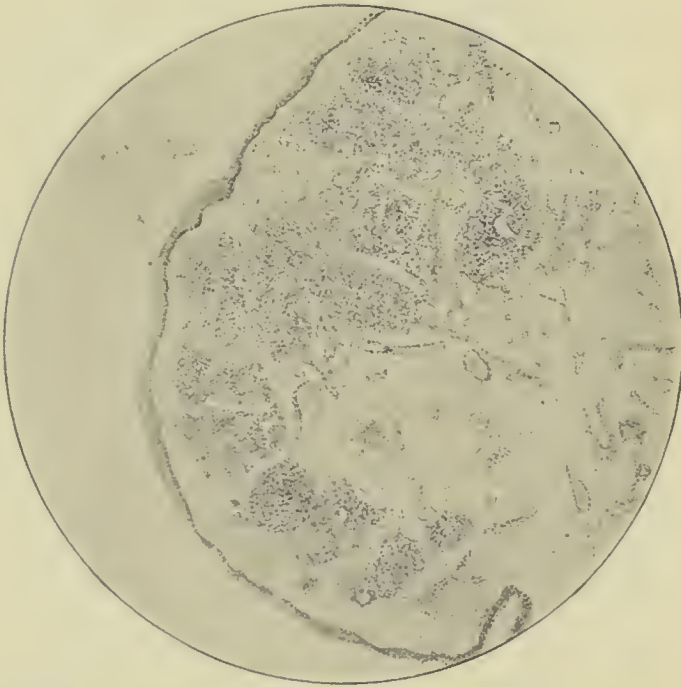
* This table includes those cases only the microscopical preparations of which have come under the author's observation.

A DESCRIPTIVE TABLE OF 16 CASES OF SO-CALLED "BLEEDING POLYPUS" OR DISCRETE ANGIOEMA OF THE SEPTUM—(Continued).

No. of case.	Operator and reference.	Sex.	Years of age.	Duration and character of previous symptoms.	Situation and character of appearance.	Histological features.	Treatment.	Result.
9	Mr. E. Cresswell Baler, Proceedings of the Laryngological Society of London, vol. x., March, 1903.	F.	26	Three months' frequent epistaxis.	Right vestibular side, close to outer border attached by thin pedicle; small bean-shaped growth, slightly lobulated.	Transverse section of close-textured granulosomatous fibro-angioma. <i>Envelope</i> : Epithelium; squamous with horny layer, but devoid of a large area, where a few cones only dip into the stroma. <i>Vascular element</i> : Numerous rather small channels, chiefly about the centre, empty with one exception, containing a trace of red cells and plasma. All lined by a delicate endothelium. <i>Cell element</i> : Chief mass a dense stroma, more fibrous near centre, uniformly interspersed with areas of capillary tissue merging into a deep granulosomatous submarginal zone. All the endothelioid cells are spindles. Lymphocytes are interspersed throughout, richly under the margin.	Removed by avulsion; base cauterised; no return.	Cure.
10	Dr. St. Clair Thomson, Proceedings of the Laryngological Society of London, vol. xi., January, 1904.	M.	—	—	Centre of cartilage of septum anteriorly; sessile; small growth of the size of a cherry stone.	Longitudinal section of soft, loose-textured fibro-angioma. <i>Envelope</i> : Epithelium; stratified, squamous, thin, or a mere horny layer; rarely replaced by masses of plasma variously stained, holding a few leucocytes and cell debris. <i>Vascular element</i> : Blood spaces large and numerous towards base, thin-walled; one a narrow, blood-filled sinus with tributaries communicating supported by a coarse-meshed fibro-angiomas structure; another large channel branches dichotomously. <i>Cell element</i> : Chief mass loose connective tissue stroma, traversed and perforated by capillaries and holding masses of leucocapillary proliferation; granulosomatous tissue and cellulobasis under the plasma.	Snared; base treated with galvano-cautery; bled freely.	Case lost sight of, but probably cured.
11	Dr. St. Clair Thomson, Same as No. 12 (Case 2).	F.	25	—	Left side of cartilage of septum, base of small pea, freely movable, attached by longish pedicle.	Transverse section of small cavernous fibro-angioma. <i>Envelope</i> : Epithelium; stratified, one cell deep or a mere horny layer. Replaced in part by fibrinous coagulum containing leucocytes. <i>Vascular element</i> : Mostly small rounded, thin-walled, blood-filled, endothelium-lined, separated by delicate tissue; a few central channels are larger and bifurcated and celluloblastic areas of fibro-angiomas meshwork and cellulocapillary tissue rich in endothelial cells. <i>Cell element</i> : Remainder of chief mass a loose connective tissue stroma, with a granulosomatous zone under fibrinous exudate. Herein abundance of leucocytes, free and inclosed in spaces.	Snared; base treated with galvano-cautery.	Cure. In three months only a small white scar remained.
12	Dr. Scanes Spicer, Proceedings of the Laryngological Society of London, May, 1904.	F.	30	Seven months' recurrent epistaxis.	Left side of septal cartilage; Kieselbach's area, sessile, bright red lobulated growth.	Transverse section of loose-textured granulosomatous fibro-angioma of six weeks' growth (Figs. 1, 4, 8, and 12). <i>Envelope</i> : Epithelium; stratified, with a horny layer, partly columnar and other cells replaced by fibrinous mass in which are leucocytes (phagocytes?) and shed epithelium; cocci invade the deposit and some of the cells. <i>Vascular element</i> : Blood spaces few and isolated, some surrounded by a mantle of endothelioid cells; all lined by endothelium, mostly containing red cells and fibrin; some smaller channels are grouped amidst the cellulocapillary areas. <i>Cell element</i> : Chief mass a loose stroma of oedematous connective tissue segregating the numerous celluloblastic areas, which are chiefly peripheral; leucocytes and occasional red cells, freely interspersed; submarginal granulosomatous tissue under the fibrinous exudate.	First removed in provinces; re-erect growth freely excised, cauterised and galvano-cauterised.	Cure.
13	Mr. H. Betham Robinson, March, 1905.	M.	58	Three months' previously a blow on the nose; then obstruction, epistaxis twice.	Left side of septum above cartilage of tubercle; fleshy-looking growth "like a sarcoma," half an inch long.	Longitudinal section of small bean-shaped cavernous fibro-angioma. <i>Envelope</i> : Epithelium absent, except a small trace of columnar cells at one spot; most of free surface covered by an organised material merging into the vascular tissue of the growth. <i>Vascular element</i> : Large Y-shaped, thin-walled, clot-filled blood channel takes up great portion of one extremity. A few large spaces near; remaining channels form the open spaces of the fibro-vascular areas. <i>Cell element</i> : Chief mass, a delicate fibrous stroma broken up by centres of fibro-angiomas tissue, and becoming granulosomatous peripherally.	Removed with snare.	Cured.
14	Dr. V. H. Wyatt Wingrave, December, 1904.	F.	37	18 months' gradual nasal obstruction; slight hemorrhages.	Left side of cartilage of septum, half an inch beyond the rima vestibuli.	Longitudinal section of fibro-angioma. <i>Envelope</i> : Epithelium; squamous or horny cells, mostly replaced by fibrinous material with leucocytes. <i>Vascular element</i> : Several very large thin-walled channels filled with blood, mostly thin-walled, smaller channels near the base. <i>Cell element</i> : Chief mass loose stroma of oedematous in the centre, broken up by areas of trabecular fibro-angiomas structure or perforated by small channels, richly proliferated with endothelioid cells; coarser fibres radiating from base encircle these areas; lymphocytes generally disseminated; a granulosomatous subplasmatic zone peripherally.	Snared and site curetted; re-erect and operated on again.	Cure; no recurrence after second removal.
15	Dr. Wyatt Wingrave, February, 1905.	F.	70	18 months' slight hemorrhages; slight pain.	Left side of cartilage of septum.	Transverse section of soft-cell fibro-angioma. <i>Envelope</i> : Epithelium; squamous with horny layer, mostly replaced by plasma suspending leucocytes as a rule; elsewhere, including base, a thick mass of blood clot, commencing abruptly, organising and ensnaring numerous leucocytes. <i>Vascular element</i> : Mostly young capillaries forming a network close to, and running into, coagulum; three dilated channels of moderate size, many smaller about centre, cut transversely, all lined by a large spindle-cell endothelium. <i>Cell element</i> : Chief mass a homogeneous structure formed of lymphocytes and polynuclear leucocytes packed in loculi of capillary meshwork; a few are plasma cells. At the centre, and at one spot beneath the epithelium, is an area of oedema.	Removed by snare; re-erect; two subsequent removals.	Shows tendency to recur.
16	Dr. H. Tilley, 1905.	M.	18	Constant epistaxis.	Left side of cartilage of septum, on Kieselbach's area; pale, size of pea, ulcerated from digital traumatism.	Longitudinal section of small close-textured granulosoma. <i>Envelope</i> : Epithelium; squamous, stratified, with horny layer, and penetrating by leucocytes as a rule apex; elsewhere, including base, a thick mass of blood clot, commencing abruptly, organising and ensnaring numerous leucocytes. <i>Vascular element</i> : Mostly young capillaries forming a network close to, and running into, coagulum; three dilated channels of moderate size, many smaller about centre, cut transversely, all lined by a large spindle-cell endothelium. <i>Cell element</i> : Chief mass a homogeneous structure formed of lymphocytes and polynuclear leucocytes packed in loculi of capillary meshwork; a few are plasma cells. At the centre, and at one spot beneath the epithelium, is an area of oedema.	Snare and galvano-cautery.	No recurrence.

sented in Fig. 4 (a most instructive and interesting specimen in many respects), some isolated and exfoliated cells of the epithelium, vesicular and dropsical in appearance, have become imbedded in a mass of organising deposit, and although still to be seen *in situ* are probably in process of gradual destruction in this manner. The enveloping material mentioned above can often be visibly separated into three distinct layers: an outer one, consisting of homogeneous plasma containing scattered leucocytes; a middle layer of

FIG. 4.

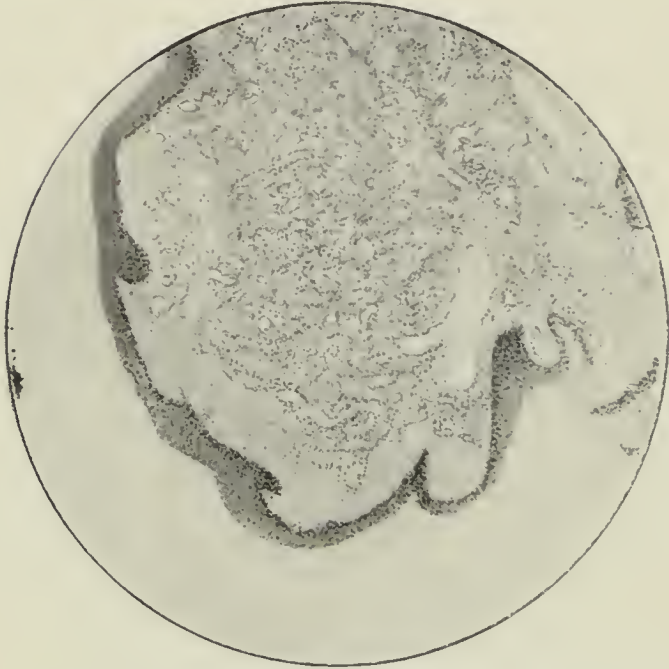


Transverse section of a loose textured fibro-angioma of the septum, of recent growth, showing peripheral areas of cellulo-capillary tissue. Dr. Scanes Spicer's case. (No. 12.)

fibrinous reticulum, including leucocytes reduced to granules and débris; and an inner layer of active phagocytes. These layers or zones are rendered tinctorially distinguishable by each exhibiting a different colouration. In the case just alluded to some large cells in the coagulum are crowded with cocci, and groups of these organisms also occur free. Below, in the body of the growth, there is usually an area of granulation-tissue with fibroblasts. In some cases the denuded situations show clear evidence of ulceration. I have noticed similar erosion and absorption of the epithelium in angioma

of the larynx (Fig. 5); the extreme liability to bleed is obviously associated with this absence of an organised investment. Case 7 in the table, an immature granulomatous body, was entirely surrounded by a delicate structure largely derived from fibrin; it bled freely. Case 1, on the other hand, an angeio-fibroma from the vestibule (Fig. 3), with a stratified and horny epithelial investment, bled but slightly

FIG. 5.



Longitudinal section of fibro-angioma of the larynx; the pedicle is seen below on the right. A somewhat coarse cellulo-capillary meshwork rich in endothelioid cells in an oedematous stroma.

on touch. The squamous epithelium shows a great tendency to proliferate into the body of the growth, sometimes forming a cornified imbricated mass or cone, at others extending completely across and bisecting it (Fig. 6). Columnar ciliated epithelium is much less common but may exist exclusively (Case 2), and both forms may occur on the same specimen. The variety of epithelium does not depend on the site, though much affected by pressure and other external conditions. Invaginations of epithelium, resembling ducts in transverse section, are rare in bleeding polypus; nevertheless, such intrusions do occur and when lined by a double row of cells, especially if red blood corpuscles happen to be included within the ring, create an appearance which is apt to

be mistaken for a blood channel with an endothelial wall duplicated by proliferation. Glands and gland ducts are also closely imitated in this manner, as noted by Brühl⁵ in aural polypi.

2. *The vascular element.*—The vessels assume such variable forms in all types of bleeding polypus that a great deal of the difficulty in their classification and nomenclature is attributable to this fact. To begin with, in the absence of red blood

FIG. 6.



Transverse section of a spongy cavernous angioma. A delicate stroma perforated by almost uniformly small channels. Dr. Brown Kelly's case (No. 4).

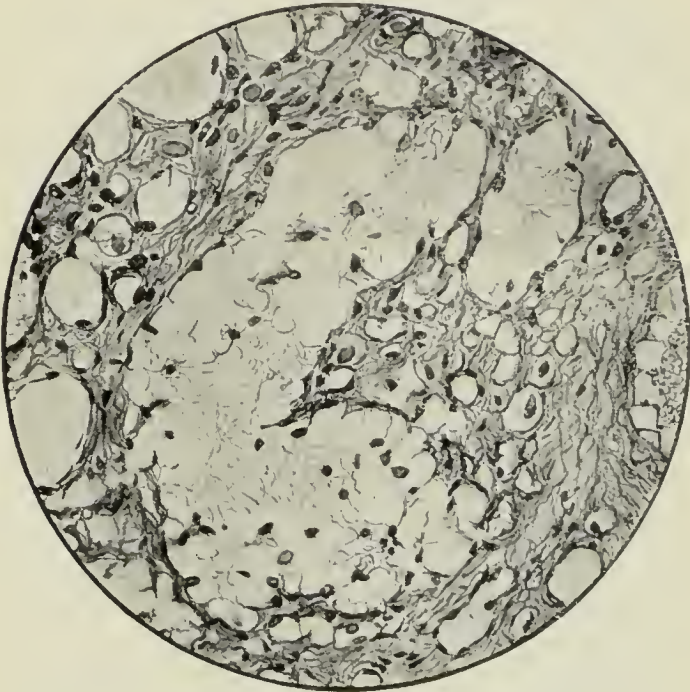
cells or other contents in the gaping and dilated channels and spaces throughout an entire section, or of any normal wall structure supporting the thin lining of endothelium in the same, it is not an easy matter correctly to define such channels or to decide whether they have served for the conveyance of blood or of lymph, or if blood whether arterial or venous. Probably a certain proportion of the specimens in

⁵ G. Brühl: Archiv für Otologie, Band xxx., 1901.

which these conditions obtain would be correctly described as lymphangeiomata, as, indeed, they have been by some authorities, but this being always a difficult point either to prove or disprove I shall make but few allusions to this variety of septal angioma in the sequel. Dilated lymph spaces occurring in the connective-tissue stroma are mentioned in a description of the wandering cells. (Cf. Fig. 12.)

The blood-vessels occur in the form of minute capillaries and every intermediate grade of dilated, arborescent, or varicose channel up to the large blood spaces or "sinuses." The

FIG. 7.



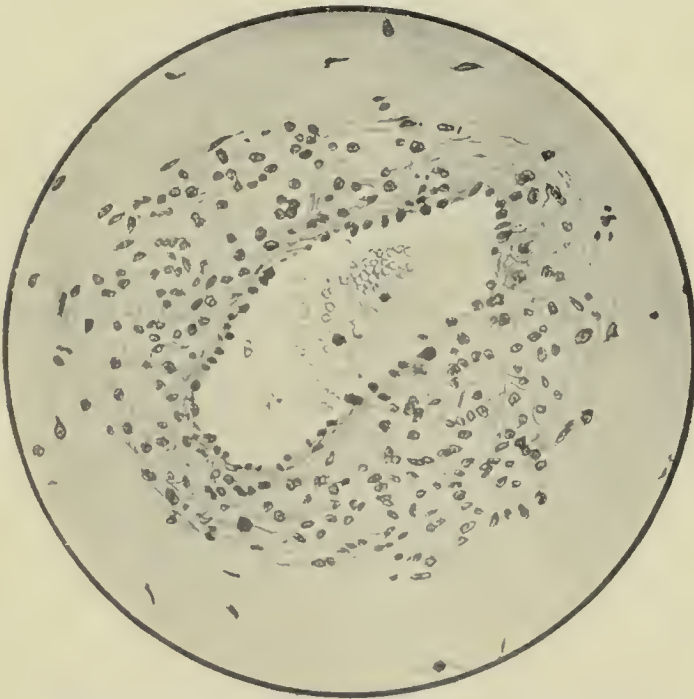
Higher magnification of a blood space in Fig. 6, showing reticulum of secondary proliferation.

local distribution both of the large and small vessels with respect to the area of section is often equally indefinite, though some specimens consist of spongy angiomatous tissue almost throughout. One character, however, is fairly constant—namely, the lack of true venous or arterial structure in the walls of the channels and spaces, so that no distinction between adventitia, media, and intima can be made, and a separate description is usually required in each case. A single layer of endothelial cells can always be discerned; in many specimens it is shed as an artefact and is then seen

lying in the lumen in the form of a ring. It may be the only organised wall structure in small channels, though usually a condensation of the fibrous tissue of the stroma serves to strengthen it.

The capillaries are abundant in most specimens and in all stages of growth; in the youngest portions they are often embryonic and so minute as to allow of the blood cells passing in single file only, but a delicate endothelial wall can always be detected. The precise nature of the spongy vascular tissue in Fig. 6 is not clear. The section is made

FIG. 8.



Transverse section of a blood channel from Fig. 4 (No. 12), showing a circumvascular mantle of non-malignant peritheliomatous proliferation.

transversely to the pedicle and shows well the calibre of the blood channels. It is seen at once that this is not a capillary angioma and therefore cannot be correctly described as teleangiectatic. This peculiar variety of vascular tissue is probably some modification of connective tissue; the septa that divide the blood spaces are not true fibrous trabeculae but are formed of the loose fibrillae of the stroma, with a modified endothelial lining; this is better brought out in the magnification of one of the areas shown in Fig. 7. The connective-tissue cells are seen to be

proliferating into the lumen of the space forming a delicate reticulum and it has been suggested that the blood in the space was thrombosed and formed a supporting framework for the proliferating process. In the connective tissue of organising blood clot a similar process may be seen going on. Fig. 7 also shows the gradations that occur in the calibre of these minute channels. On the left in the same figure part of a more highly organised blood channel is seen with thicker walls apparently developed from this

FIG. 9.



Transverse section showing a cavernous area of a close textured fibro-angioma. The dark masses forming the walls of the large spaces represent bands of fibrous tissue. Mr. Hunter Tod's case.

tissue. Some of the channels contain blood, others fibrin, others again are filled up by the delicate reticulum already mentioned, or by all three together. In the absence of a more precise denomination I must regard this specimen as a form of cavernoma, though many would describe it as teleangiectatic.

Blood clot consisting of erythrocytes with the usual complement of leucocytes usually occupies the blood spaces, but they sometimes contain fibrin or colloid material. Fig. 8 represents one of several vessels of a quite different class

from the same case as Fig. 4 (Case No. 12). The chief peculiarity of these channels, one of which was a large, wide, pouch-like opening, is the character of the circumvascular cell proliferation, giving them an appearance under low magnification of vessels with very thick walls. This idea is dissipated by the fact that in some the proliferation

FIG. 10.



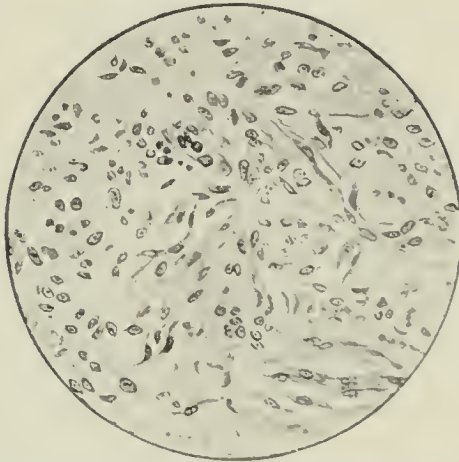
Entire longitudinal section of soft cell fibro-angioma, base below. The cellulo-capillary areas densely packed with endothelioid cells are mostly enclosed within the divisions of the stroma. The dark places indicate extravasated blood cells stained with eosine. Dr. StClair Thomson's case.

is strictly confined to one-half of the circumference, the other half showing only a single layer of endothelium.

The *large blood spaces* are sometimes called "sinuses," but if this term be employed, confusion with the normal sinuses of the erectile mucous membrane of the septum, with which they certainly have no essential relationship, must be carefully avoided. The illustrations show some interesting variations in the construction of the spaces. In Fig. 9

the walls are constituted by dense bundles of nucleated fibres interrupted at intervals by the entrance of tributary channels and faced by a somewhat coarse endothelium. These bundles remind one somewhat of the bands of involuntary muscular fibre that encircle the erectile sinuses of the mucosa, but an examination of the figure shows that these fibres are rather partially distributed, there being places where the vessel wall is naked, both as regards this tissue and cell proliferation. It is probable, however, that the normal sinuses being venous, these channels may be so likewise. In Fig. 2 is seen a large blood space containing red blood cells and leucocytes. It is lined by endothelium supported by the fibres of the stroma which are stouter and more numerous in this situation and under

FIG. 11.



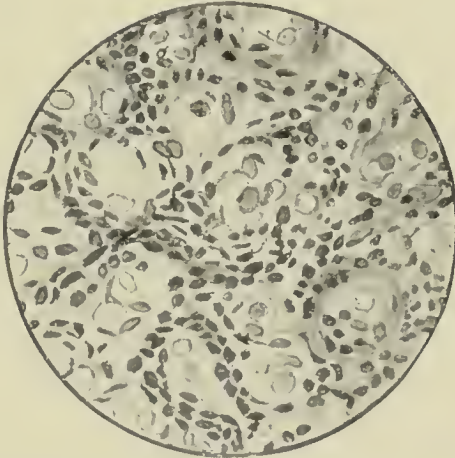
A cellulo-capillary area showing spindle-shaped endothelium, endothelioid cells, capillaries, and lymphocytes, from transverse section of granulomatous fibro-angioma of vestibular ala. Mr. Cresswell Baber's case.

higher magnification are seen in many places to be longitudinally as well as transversely disposed. Below, are irregularly shaped cavities into which headlands and peninsulas of nucleated fibrous tissue project, suggesting the confluence of neighbouring spaces in a coarse fibro-angiomatous meshwork from continuous wear and tear by the blood stream.

3. *The cell element* in bleeding polypus may be considered under two divisions: (1) the so-called wandering cells or leucocytes; and (2) the fixed cells, the word "fixed" being employed here conventionally and only for the sake of distinction from what are obviously leucocytes. The identity between leucocytes in the tissues and

those encountered in blood films is stated to be not proven, but in these growths the apparent uniformity between the leucocytes, mono- and poly-nuclear, in the blood mass of the large sinuses and those in the tissues, sets this point, I think, at rest. Three principal varieties of these cells are distinguishable in bleeding polypus: (1) the small mononuclear leucocytes, "free nuclei" or lymphocytes—i.e., the "small round cells" of surgical pathology; (2) the polymorphonuclear leucocytes, often called phagocytes; and (3) the larger mononuclear leucocytes described by some writers as Unna's plasma cells.⁶ The lymphocytes are the most universally present; they insinuate themselves amongst the tangled skeins of capillaries, here in the lumina and there in the interspaces, where

FIG. 12



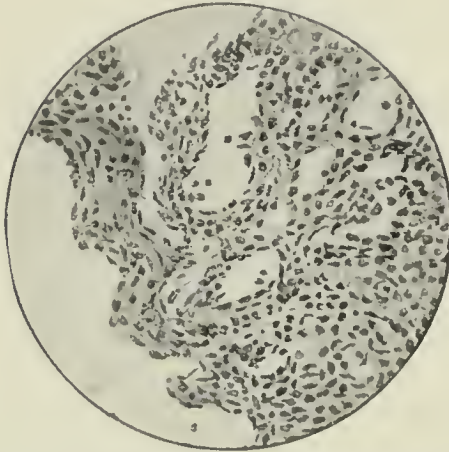
Higher magnification of a densely proliferated cellulocapillary area from near the periphery of case No. 12 (Fig. 4). The nuclei of the endothelioid cells are large and ovoid. Chains of lymphocytes fill the lymph spaces.

they either indicate a perivascular lymph space or a lymph space in the meshes of the stroma. Towards the periphery they form chains or strands (Fig. 12) or collect in the apex of a papilla (lymph space) immediately beneath the epithelium. The polymorphonuclear leucocytes or phagocytes, identified by their characteristic nuclei, are almost confined to the specimens in which there is much loose connective tissue and are then usually found in the subepithelial zone. In the granulation tissue areas they occur with lymphocytes irregularly alternating with columns of fibroblasts. They enter largely into the

⁶ Biehl: Loc. cit. and Delafield's Pathology, 1904.

composition of the granulomas and into the substance of the external fibrinous layers that either denude the epithelium or envelop it, as already observed (see External Envelope). Unna's plasma cells are the least frequent of the wandering cells and are not usually met with in the cavernomatous, but occur occasionally in the granuloma types. They are larger than the polymorphonuclear leucocytes; unlike them, the cell body takes a light red colouration with eosine. This fact renders the exact correspondence of these cells with Unna's doubtful, as the latter stain bodily with basic aniline dyes. The rather large nucleus stains darkly with hæmatoxyline and is placed excentrically. Their existence, nevertheless, indicates a situation where growth is active and consequently lympho-

FIG. 13.



Part of the wall of a sinus in Fig. 9. Richly cell-proliferated, trabecular, fibro-angiomatic structure.

cytes and phagocytes, embryonic capillaries, and fibroblasts usually occur in association with them.

A description of the fixed cells apart from the vascular tissue and the stroma into which they enter so conspicuously is difficult without creating some repetition. I now refer to practically all cells except the three classes of leucocytes just described and believed to be endowed with migratory properties. These fixed cells constitute a very noticeable feature in all the fibro-angiomas and are intimately associated with the capillaries as well as the large blood spaces and channels. The drawings show some extremes of variation in respect of the distribution of these cells. In the case of Fig. 6 the angiomatic structure consists of an anomalous species of connective tissue which one hesitates to regard as a true capillary formation and cell clusters

are absent from it. In Figs. 3 and 10, on the other hand, representing the soft fibro-angioma, an abundance of cell proliferation fills up the interspaces between the divisions of the stroma throughout most of the section. In Figs. 4, 8, and 9 a much more localised cell distribution is seen, the clusters being limited to certain areas, but again always in association with blood channels of one form or another. Fig. 13 shows a higher magnification of the peninsula at the upper part of the lowest blood space in Fig. 9. It represents a fairly typical example of the open formation which I have described in the table as "cell-proliferated, fibro-angiomatous, trabecular structure or meshwork," in order to indicate the presence of a tissue familiar to the pathologist in the grosser fibro-vascular tumours. The open spaces between the fibrous trabeculae distinguish it from what in the same table I have described as "cellulo-capillary" tissue which is of closer formation; a richly cellular angiomatous tissue pervaded with capillaries (Fig. 12). The latter is most often confused with sarcomatous cell masses, and forms the bulk of the section in Figs. 3 and 10. The cell element in both these varieties of angiomatous tissue may be regarded as the result of proliferation from the endothelial cells of the capillaries and blood channels. If the process were to take place in an inward direction in the large sinuses an irregular encroachment upon their lumina would be the result, such as seems to be indicated in a few places in Figs. 9 and 13. We are scarcely at present in a position either to deny or affirm such a possibility.

It would be interesting could we discriminate with some nicety between the endothelial, by some authorities termed endothelioid cell, and connective-tissue cell in these areas of proliferation, but the most searching scrutiny under a $\frac{1}{2}$ inch oil immersion gives little assistance in distinguishing between the capillary and intercapillary cells and those in other situations—e.g., clustered around the large channels. A broadly oval or slightly more elongated nucleus lightly stained by hæmatoxylin, granular, or exhibiting a chromatin network, and sometimes a well-marked nucleolus are the main features common to all. The cell body is to be made out in the fusiform variety of endothelium (Fig. 11), otherwise it is practically indistinguishable except in a fresh scraping stained with that object. I believe with regard to these fixed cells as we see them in the granulation tissue or growing areas of bleeding polypus that connective-tissue cells of fibroblastic parentage may here be observed assuming the rôle of endothelial cells in the embryonic capillaries, and conversely from the endothelial walls of the capillaries and blood spaces, cells can be seen to have been proliferated into the stroma which are either to become fixed connective-tissue cells or are to be the

immediate parents of the same, since between these and the endothelial cell every intermediate form is traceable. An observation by Ford Robertson has a useful bearing on this point. He says: "The question whether in certain pathological processes the endothelial cells or connective-tissue corpuscles are involved, must be regarded as entirely gratuitous. The two are essentially identical. The endothelial cells lining the arachnoid spaces, as well as those of the outer surface, are but connective-tissue cells in a special position and performing a special function. They present no morphological difference, behave in the same way under abnormal nutritional conditions, and are each capable of forming fibroblasts."⁷

An opportunity has not so far occurred of making a special examination for gametoid cells.

4. *The stroma or ground substance* is a delicate fibrillary tissue which is best studied in those specimens in which considerable areas are to be seen less occupied by blood spaces or cellular proliferation. Such areas are commonly oedematous to a certain extent, a feature shared by nearly all pendulous growths from the nasal mucous membrane. In these situations the cell nuclei assume the usual stellate or elongate-triangular form, the cell body being seen under high magnification to give off slender processes which merge into, and are lost in, the general framework. In nearly all cases there is a clear peripheral zone beneath the epithelium but there is no hyaline membrane as in mucous hypertrophies, nor except on the rarest occasions are isolated fibres of elastic tissue seen. In certain situations, as around large blood channels and proliferation areas, the stroma becomes more fibrous and the compressed nuclei more elongated or linear (i.e., plaques, in section vertical to their surface). In Fig. 10 these fibrous strands assume the form of trabeculae of somewhat loose texture infiltrated with red blood cells which are extravasated into it and elsewhere throughout the growth, most probably during surgical intervention. In the granulation tissue areas, which I have mentioned in my description of about half the cases in the table, as lying for a considerable depth beneath the superficial masses of fibrinous deposit, the stroma is supported by young formative cells.

2. *Subdivision of Types.*

Walliczek (16) distinguishes three principal types or sub-species of bleeding polypus, and these are linked together by many intermediary combinations. In the table published last week are included many excellent examples of the commoner forms, as well as certain outlying members

⁷ The Pathology of Insanity, p 120.

of the group, and they range from the simple granuloma, arising apparently from some infective process—e.g., Cases 9 and 16—to the soft angeio-fibroma, the nearly pure fibro-angeioma, and the cavernoma. Owing, however, to the complexity resulting from the intermediate members, this subdivision by Walliczek and others cannot be said to rest upon a strictly scientific foundation; it is, however, convenient. These types of discrete septal angeioma, as already foreshadowed, are (1) the granuloma type, mainly constituted of granulation tissue; (2) the fibromatous or connective-tissue type, in which I recognise two sub-varieties, the loose textured or oedematous, and the close textured soft cell fibro-angeioma; (3) the cavernomatous or purely vascular type, in which the proportion of spongy angeiomatous tissue far exceeds any other. The term *telangeiectoma*³ is freely used abroad in connexion with this type, but as the capillary character of the tissue is not well established that of cavernoma is here selected as more etymologically correct, though still falling short of actual precision.

3. *Pathological relationship with benign neoplasms*—The difficulties that beset the rhinologist in an attempt to specify the true position of bleeding polypus in oncological classifications are rendered more apparent by a setting forth of the principal relationships that are borne by the various members of the group to other neoplasms. It will be convenient to consider, first, the very evident affinities with benign growths and, secondly, the moot question of relationship to malignant tumours.

The *granuloma type* is, in my experience, certainly one of the best defined, and it is considered by high authorities to lie at the foundation of all others. Of the 16 cases which I have microscopically reported upon in the table, 10 are described as containing a proportion of granulation tissue, the significance of which is more fully discussed at the conclusion of this paper. In so far, however, as the granulation tissue so commonly present can be considered to share in the constitution of the type of angeioma in which it is found, it may be mentioned as reflecting very markedly the characters of young connective tissue growths in which developing capillaries and blood spaces, fibroblasts, and leucocytes are the main features. In Vol. VII. of the Proceedings of the Laryngological Society of London will be found a description by the writer of a soft, intensely vascular naso-pharyngeal tumour recurring after removal and feebly suggesting a diagnosis of sarcoma though presenting no other very evident signs of malignancy. Microscopically its appearance at once recalled the granulomatous areas of a discrete angeioma—oedematous stroma basis, numberless small blood channels, and the rest. A similar

³ More properly *telangeiectoma* (Gr., *τελον*, the end)

species of granulomatous angeioma occurs as a tumour formation in the maxillary antrum. On the other hand, it is important to note that in granulation polypi of the nasal or accessory cavities, especially of the frontal which are largely composed of lymphoid tissue, but slight structural relationship to bleeding polypus prevails owing to absence in them of angeiomatous tissue. I may state in this connexion that it is my belief that a study of aural polypi in association with bleeding polypus of the septum throws considerable light upon the pathology of the latter and tends to show that the nasal neoplasms have to some extent their counterpart in the aural, the starting point in either case being usually an inflammatory tissue formation. Moos and Steinbrügge discovered amongst 100 aural polypi 55 granulation tumours, 27 *angeio-fibromas*, 14 fibromas, and four myxomas.⁹

The connective-tissue type as represented in the œdematous fibro-angeioma seems to have suggested to a large number of observers so close an affinity to the papillary fibromas of the nasal mucosa—the soft papillomas of Hopmann—that, with Réthi, Walsham, and others, they fail to see a sufficient distinction to warrant a special place in rhinology for this form of bleeding polypus. To me the mere segregation of the characteristic angeiomatous clusters or channels by the accident of œdematous infiltration of the intervening stroma does not render obvious any such affinity. True myxomatous tissue I have not yet observed. Selecting at random a microscopic section of a papillary fibroma (mucous hypertrophy) of the septum removed by myself, I find the following distinctive features, to which I invite comparison with the descriptions of loose textured fibro-angiomas in the tables. Beneath a deep fringe of ciliated epithelium a hyaloid basement membrane; in a loose œdematous stroma a profusion of lymphoid cells almost constituting lymphoid tissue, Fraenkel's bodies; capillary arterioles exhibiting *well-marked transverse and longitudinal fibre cells*; muciparous glands and erectile sinuses; many spaces in the stroma filled with œdematous material. I have never seen in any of the published descriptions of bleeding polypus an allusion to true arterial capillaries, though Heymann found a vessel "with walls thick enough for an artery" (7) and Krieg speaks of gland structure near the pedicle in one of his cases but being the only instance on record there may possibly be some error here. On the other hand, in the anomalous group of inferior and middle turbinal angiomas described by Schwüger, Jurasz, and Seifert and Kahn (11a) both glands and epithelial intrusions were present, and through these some link with the papillary fibromas may be recognised. I have seen no examples of these turbinal fibro-angiomas.

⁹ Brühl: *Archiv für Otologie*, Band xxx., 1901.

Passing now to the close-textured forms of the connective-tissue type, the more genuine fibro-angioma of the septum, we notice an important and interesting relationship with the diffuse angio-fibroma of firm texture of the naso-pharynx, though I am inclined to regard the proportion of vessels greater as a rule in the septal angioma, on which account I reverse the order of the terms, *angio-fibroma* more correctly defining the naso-pharyngeal growth. In a hitherto unrecorded specimen of bleeding polypus kindly submitted to me by Mr. H. Betham Robinson, and described in the table (No. 13), the histological similarity with Dr. Herbert Tilley's case of extensive angio-fibroma of the naso-pharynx¹⁰ is most remarkable, the former being in fact a nearly pure fibro-angioma only of a more delicate texture. When investigating the relationships of the fibro-vascular combination in bleeding polypus one is at once reminded of Roe's classical case of *diffuse* nasal angioma upon which he wrote his paper (2) and formulated a table that included three or four examples of the discrete bodies which afterwards came to be known as bleeding polypus of the septum. There is no difficulty in singling these out from the remaining cases in his collection; Roe's angioma was attached to one side of the roof of the nasal cavity, superior and middle turbinals, and septum. After removal, the recurrence which grew from the septum only, was said to exhibit a transformation from angioma to endothelioma and later again to myxomatous angio-sarcoma; I should suggest that this was probably a hæmangeio-sarcoma from the first. The likelihood of its being a malignant transformation has been adversely discussed by Norval H. Pearce in the American Laryngological Society (16), though accepted as a fact by Hasslauer; it is commonly stated that certain naso-pharyngeal angiomas become more and more sarcomatous after each operation. In the same category with the fibro-angiomas, but exhibiting affinities of a different character, was my case, hitherto unrecorded, and represented in Fig. 3 (No. 1). Like that seen in Fig. 2 it was attached to the ala of the vestibule near the floor; the microscopic section has been more than once diagnosed as a sarcoma. Though partly cavernous in structure the parenchyma of the growth is a form of cellulo-capillary tissue in which the inter-capillary cells predominate and are jumbled together without apparent order; the nuclei of all the cells are large and of an oval, tending to fusiform, shape; they are particularly crowded in the walls of the capillaries. Its chief relationship is towards the soft fibromas of the respiratory tract, the word "soft" here implying an absence of coarse fibrous tissue. Another example (from the septum) is seen in Fig. 10. These young fibromas are apt to resemble sarcoma and are often mistaken for it but I have not yet met with a nasal case that offered

¹⁰ Proceedings of the Laryngological Society of London, vol. x.

much real difficulty in diagnosis; one must always be prepared for an ambiguous appearance in the minute structure of tumour formations of innocent behaviour that arise from the vestibular tissues.

The cavernous, telangiectatic or vascular tissue type embraces many varieties of angiomatous tissue and the figures accompanying this paper illustrate some of the forms it assumes. The relationship to true nævi, telangiectatic and cavernous, of other parts of the body is somewhat obscure and I shall presently have occasion to remark upon certain distinctions between one and the other. Hasslauer has collected seven cases of what he regards as cavernous angioma of the septum and other writers, chiefly American, recognise the existence of true nasal angioma. The late W. J. Walsham¹¹ described a pure non-pulsating angioma of the septum and a pulsating angioma or arterial nævus, the former broadly pedunculated, and the latter sessile. Both kinds he believed to be exceedingly rare, and he quoted Cobb's (10) statistical statement that out of 7429 nasal cases examined at the Massachusetts Hospital, only one example of pure angioma was recorded. This was Cobb's case, but judging, however, from Dr. Whitney's somewhat meagre pathological report upon it—which ran as follows: "Growth with large vascular sinuses with more or less round cells about—cavernous angioma"—this was apparently an average case of bleeding polypus of the septum. Walsham's naked-eye description of his two forms of angioma, with the exception of pulsation, virtually tallies with that of Cobb's case. He does not, however, use the term "bleeding polypus" in his work and suspects that nearly all the growths called nasal angiomata by authors were either myxomatous growths containing numerous blood-vessels, or they contained sarcomatous elements. This is precisely the conclusion which I am anxious to negative. Walsham, in fact, does not appear to have been acquainted with the labours of the Germans. The occurrence of pulsation in a bleeding polypus must be extremely unusual. Bland-Sutton states that when an angioma consists entirely of irregular blood-containing spaces, two or more vessels, sometimes of considerable size, convey blood to it from an adjacent artery.¹² It would be difficult in the case of these small nasal tumours to verify the presence of such vessels, but they never consist entirely of large blood spaces. The same author speaks of the occasional "disappearance of nævi spontaneously, though they more often increase in size or become converted into cavernous nævi."¹³ I am not aware of any clinical report of a pulsating angioma of the nasal septum with the exception of Ver-

¹¹ Nasal Obstruction, 1898.

¹² Tumours, Innocent and Malignant, p. 179.

¹³ Ibid.

neuil's (1). Granting this case to be well authenticated, we have in it, perhaps, the nearest approach to a true angioma affecting the nasal mucous membrane that can be found in literature, but unfortunately we have no pathological report. It occurred in a male, aged 52 years, and took the form of a round, dark-red, sessile swelling, of the size of a cherry-stone, pulsating synchronously with the heart and growing on the left side of the septal cartilage. There was a history of severe epistaxis of ten years' standing. Several other small erectile patches were found in various parts of the body—e.g., the right temple, soft palate, &c. On subsequent examination the growth was no longer found in the left fossa but an exactly similar one was discovered on the right side of the septum. It was eventually got rid of by repeated cauterisations, but the patient is said to have died extremely cachectic four years later. This case seems to have served many authors of text-books as a model for descriptions of nasal angioma: certainly Hasslauer includes it amongst his 55 cases of bleeding polypus.

The indefinite organisation and disposition of the vascular element in bleeding polypus of the septum render difficult the establishment of a common anatomical basis between it and the somewhat analogous structures of cavernous nævi of the skin or venous cavernoma of the liver and other organs and it is remarkable that the nasal cavities are rarely or never cited by pathologists as seats of angiomatous tumours. The apparent similarity between the partial septa depicted in the blood sinus below and to the left in Fig. 2 and the trabeculæ of cavernoma of the liver, which are internal prolongations from the capsule of the tumour, is dissipated on careful inspection, but the resemblance between their structure and that of certain angiomas of the skin is more obvious. In the angiomatous growths of the *pharynx* and *larynx*, on the other hand, a purer homology with the capillary (telangiectatic) and cavernous variety of nævi is more easily traceable. Angiomatous neoplasms in the vicinity of the glottis, which have all the naked eye appearances of true cavernous nævi, are occasionally seen but those so far exhibited have not been removed by operation. Dr. Percy Kidd has kindly forwarded me a section of the lobulated, dark-red, raspberry-like angioma (cavernoma) which he removed from the larynx and described in 1888.¹⁴ The spaces are large and circular and occupy nearly the whole of the growth, recalling Dr. Kelly's septal case (Figs. 6 and 7) but on a larger scale. Another example of angioma of the larynx is shown in Fig. 5; it consists of a plexus of dilated capillaries in a loose connective-tissue basis; the section is longitudinal and includes the pedicle. Thus in the histologically related

¹⁴ Brit. Med. Jour., March 17th, 1888.

tumours of the larynx a similar variation of type with intermediate forms confronts the pathologist. Other varieties of the vascular type of bleeding polypus are described. Amongst Scheier and Heymann's cases were some which they distinguished as teleangiectatic lymphangioma characterised by lymph vessels and dilated lymph spaces. Krieg also includes a lymphangioma in his series but when in cases under my own observation I have been inclined to diagnose a lymphangioma, I have always found it difficult to get that diagnosis corroborated by competent authorities or to obtain confirmation of the same diagnosis when such has been reported. The multiple punctiform telangiectases of the septum associated with a similar condition of other mucous surfaces and of the skin, described by Dr. Wm. Osler and also by Dr. Brown Kelly,¹⁵ were minute venous angiomas. They gave rise to recurrent epistaxis and were curable by cauterisation.

¹⁵ Johns Hopkins Hospital Bulletin, vol. xii., p. 333, and Proceedings of the Laryngological Society of London, December, 1905.

PART III.—THE QUESTION OF AFFINITY WITH MALIGNANT
TUMOURS.

1. *Partly from the Clinical Aspect.*

I have reserved for separate consideration the question of relationship to malignancy. Owing to the fact that the naked-eye diagnosis of bleeding polypus of the septum presents so little difficulty to the clinician save under rare exceptions, the responsibility of associating this growth with one or other of the mesoblastic malignant tumours has hitherto rested with the pathologist on the evidence of the microscopical characters, and yet I am not aware of any recorded instance in which an unfavourable histological report has been actually supported by clinical facts. I need not insist how important to the patient and his medical adviser an accurate microscopical diagnosis must be; it is no light matter that the disquieting effect of equivocation upon the grave question of malignancy should be obviated whenever possible. A case which was exceptional in certain respects but especially as regards the clinical appearance was the atypical one No. 7 in the table—for the notes of which I am indebted to the kindness of Dr. A. Brown Kelly of Glasgow.

The patient was a male, aged 20 years, who had been habitually engaged in pugilistic encounters but had latterly received an exceptional pounding on the nose. Externally the organ was much disfigured, the superior lateral cartilage of the right side being pressed outwards, so that the upper edge formed a prominent ridge. The right nostril was completely obstructed by a smooth, purplish, readily bleeding, fleshy mass which sprang from the septum anteriorly. The opposite side was almost blocked by the greatly deflected septum. Several enlarged glands were apparent below the angle of the right lower jaw, epistaxis had existed for four months, partial obstruction for three months, and complete obstruction for one month. A piece removed for examination gave rise to very severe hæmorrhage. The man disappeared from observation but on his turning up two years later no trace of the growth was visible. The microscopical examination of the fragment showed the growth to be inflammatory and highly cellular, it contained abundance of leucocytes and plasma cells, and was inclosed by a capsule formed chiefly of organised blood clot. Taking into consideration the

appearance, vascularity, seat, rate of development, deformity, and indirect involvement of the glands, an inclination was shown to regard the growth as sarcomatous. As, however already indicated, there were no sarcomatous cells and the growth was an atypical granulomatous bleeding polypus. When sarcomatous tissue has been reported in a case falling under the general description of bleeding polypus of the septum, the statement has in my belief been too often accepted by subsequent writers and tabulators without sufficient allowance for the possibility of a misinterpretation of the microscopical appearances. Even in the case of far more equivocal tissue structure than bleeding polypus, say of the soft fibromas, the cautious pathologist knows that good clinical evidence is often invaluable, his diagnosis being in such a case partly dependent on clinical observation. On these and other grounds I feel justified in asserting that no septal growth having the naked-eye characters of bleeding polypus or discrete septal angioma has been satisfactorily demonstrated to be sarcomatous. I am, however, not in want of support in making this declaration. Langerhaus (6), in his report upon Schädewaldt's cases, thus concludes: "The absence of all cells which might direct suspicion to sarcoma proves that it is a non-malignant new formation," and this embodies the views of Schädewaldt who quotes it. Other writers might be cited to the same effect, as, e.g., Walliczek (24), who writes: "In spite of the manifold combinations that occur between the three types these tumours are always benign."¹⁶ Heymann (18a) says many of the pedunculated tumours of the septum described as myxosarcoma belong to bleeding polypus and stand much nearer to granulation tumours than to genuine sarcoma. Yet in opposition to these very definite statements there are certain reports upon individual cases which have considerably influenced subsequent writers; the following may be quoted as examples. Baumgarten¹⁷ reported a case as partly myxoma, partly myxosarcoma; Polynack¹⁸ reported a case of angio-sarcoma displaying large and small blood spaces, the intermediate substance showing characteristic sarcoma formation; Dausac found in one specimen sarcoma teleangiectoides and in another endothelial angio-sarcoma; and Sendziak recorded a case of angioma cavernosum sarcomatodes.

Roth (24) states that his case agrees most with what Paltauf designates as angio-sarcoma, but the latter seems to be an unhappily chosen term denoting only an atypical angioma, its application not being obvious. Nevertheless, Roth in his recent paper concludes from the above reports (which he quotes) "that amongst the published cases of

¹⁶ Monatschrift für Ohrenheilkunde, 1897.

¹⁷ Sitzungsberichte der Gesellschaft der Ungarischen Ohrenärzte, March, 1898.

¹⁸ Ibid., June, 1902.

bleeding polypus of the septum there are either malignant tumours, or at least some suspected as such, and hence the confusion is the greater"; furthermore, Casselberry tells us, on the strength of Sendziak's evidence, that sarcoma constitutes one of the forms of bleeding polypus of the septum. As Sendziak's paper (12) is fully translated in the *Journal of Laryngology* and as it is the first instance I am aware of in which the expression "sarcomatoid" occurs I shall quote it rather more at length. The patient was a young man, aged 34 years, who was extremely anæmic from hæmorrhage, but the clinical behaviour of the growth in his nose exhibited no evidence of malignancy. The following report was made upon it by Dr. Miklanewski: "Very numerous vessels filled with blood, they were much distended and separated from each other by thin partitions (trabeculæ); the whole growth reminded one very much of the structure of a sponge. Each partition was formed of fibrous tissue with numerous fusiform cells and also round ones, especially around the blood vessels. In those places where there were fewer vessels and where they were less regularly grouped in one part of the growth, the fibrous tissue contained more cells, nodules of different sizes, long, slightly coloured, fusiform, larger and smaller, oval, round, &c. In general their number was much more considerable than in normal stroma, besides in many places there were considerable agglomerations of them. These places were of an undoubtedly suspicious character—namely, sarcomatous. In the above case we had to deal with an exceedingly rare case—viz., *angioma cavernosum sarcomatodes*." This diagnosis was confirmed by Professor Brodowski. Sendziak concludes from it that "there existed evidence of malignant sarcoma in a benign (polypus) tumour of the nose" and he tells us that amongst others Kafemann (12)¹⁹ has drawn attention to such an occurrence, although he is fully alive to the usually innocent character of bleeding polypus. With all deference to the distinguished reporters, however, I would submit that this description tallies very well with that of an average case of bleeding polypus; take for instance that given by Norval H. Pearce, who thus writes of a case of his own (17): "Equally distributed through the ground substance are large spindle-shaped cells having large deeply stained nuclei which have been cut in all directions showing their interwoven arrangement. The tumour is highly vascularised and in the centre are numerous cavernous spaces lined by flat endothelial cells." The diagnosis made here by Pearce was "neither sarcoma nor angioma, but teleangiectoma." In other instances within my own knowledge a diagnosis of sarcoma, angio-sarcoma, and perivascular endothelioma or perithelioma has respectively been made.

¹⁹ *Revue Internationale de Laryngologie*, October, 1895.

2. *Chiefly from the Point of View of Microscopical Appearances.*

If I have succeeded in making clear my descriptions of the histological features of bleeding polypus as a whole I need only touch lightly upon the differential diagnosis of these neoplasms from malignant growths, the distinctive features of which are so amply described and illustrated in the text-books. The groups to which reference will be made are the sarcomata and their allies the endotheliomata, with which, as already mentioned, the innocent septal angioma has more than once been confounded. Concerning the endotheliomata, though our knowledge of them is incomplete, I may perhaps be allowed to recall the fact that for a long time imperfectly separated from alveolar sarcoma, they have comparatively recently received their present name and come to be more closely identified with angio-sarcoma, and though often resembling in appearance carcinoma, an epiblastic growth for which probably they had often been mistaken, their cells, mesoblastic in character, are considered to be endothelial and to spring by proliferation from the wall of a lymph or blood-channel. The result of this impression is that endothelioma is a term that has acquired a collective sense and comprises both the lymphangeio-sarcoma and hæmangeio-sarcoma, the former of which includes the commoner and more typical endothelioma. As regards hæmangeio-sarcoma owing to the fact that the sarcomatous process starting from the endothelium may proceed towards the lumen or away from it, two sub-species of endothelioma are distinguished, that form which shows the persistence of vascular lumina receiving the distinctive title of peri-vascular endothelioma or *perithelioma*, whereas for the opposite form in which obliteration of the lumen takes place Dr. Lazarus-Barlow has applied the term *enthelioma*. Descriptions and figures of these growths will be found in Borst's *Lehrbuch*, in the last edition of Ziegler, and in Hanseemann (p. 165).²⁰ The application of all this to my subject resides in the fact that the meaning and intent of cell proliferation in and around both blood and lymph vessels is often difficult to interpret; sometimes it assumes a truly malignant character by infiltrating the surrounding tissues, at other times the process is confined to simple proliferation, although possibly the difference may be only one of degree. Even the endotheliomata are said to be not necessarily malignant; Dr. W. S. Lazarus-Barlow, in an interesting letter to me, writes in this connexion that in his view "the group of endotheliomata has widened considerably during the last three years, and he is not sure if all the endotheliomata are malignant, using that

²⁰ See also Lazarus-Barlow's *Special Pathology*, 1904.

word in the common way." We are aware also that certain endotheliomata affecting the brain membranes, though causing death by pressure, do not infiltrate the brain substance and are not in a true sense malignant. On the continent—at all events, in the German provinces—the term endothelioma like epithelioma being used in its histological sense, does not necessarily bear a malignant signification. Roth, in discussing the place of bleeding polypus amongst hæm- and lymph-angiomas owing to certain affinities with these growths, and quoting Borst, tells us that Amann and Maurer apply the term intravascular endothelioma, Borrmann capillary endothelioma, and Kolaczek angio-sarcoma, to angiomatous tumours characterised by an extraordinary increase of vessel development lined by an enlarged endothelium. Borst adopts the term intravascular endothelioma or endothelioma simplex, and describes "actual columns of endothelial cells inside the capillaries as determining the character of these tumours." Roth, however, denies the existence of this endothelial proliferation in his specimen,²¹ yet it does not seem that Borst and his *confrères* have in view malignant endothelioma in our interpretation of the term. I have the advantage of knowing that the nature and degree of the cell proliferation in the hæm- or lymph-endotheliomata that Dr. Lazarus-Barlow would be most inclined to exonerate from the stigma of malignancy differ widely from what is seen in the most approximate example of cell proliferation that I have been able to show him in a bleeding polypus. Neither that gentleman nor Mr. S. G. Shattock has had the least difficulty in agreeing with me as to the distinction between any case of the latter that had been unfavourably reported upon and the least malignant endo- or perithelioma. The view given above agrees with that of Dr. Lazarus-Barlow as set forth in his "Special Pathology," 1904. In the lecture delivered by him at the Royal Free Hospital on Nov. 8th, and to be published in the archives of the Middlesex Hospital early in 1906, Dr. Lazarus-Barlow still further distinguished the endotheliomata from the angio-sarcomata. Intravascular endothelial proliferation, such as described by Borst, I, like Roth, have not been able to demonstrate in any septal angioma to my own satisfaction, though an appearance strongly suggestive of this is sometimes occasioned by a general crowding of the enlarged endothelial cells. Extravascular proliferation is, however, of common occurrence and is best studied in isolated situations such as is shown in Fig. 8. The proliferation is here of a simple character and although manifestly thrown off from the endothelial lining may be regarded as connective tissue or *endothelioid* cell proliferation of an innocent character. In an anatomical sense, therefore, it is peritheliomatous, and though under a low power (Fig. 4) the clusters resemble the cell-

²¹ Loc. cit., p. 529.

mantles of Ziegler and Borst²² the likeness to a malignant perithelioma is largely dispelled by higher magnification. We know, furthermore, how in granulation tissue a young capillary vessel is commonly seen to be surrounded by connective-tissue cells and Dr. Lazarus-Barlow states that often in capillary nævi the endothelial cells proliferate and appear to become converted into a tissue which is similar to ordinary connective tissue.²³

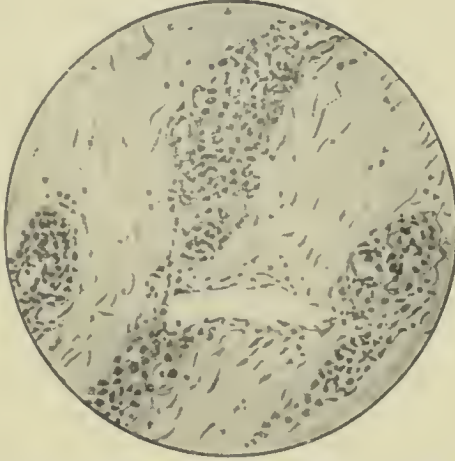
Having discussed briefly the cell elements of the angiomatous tissue in bleeding polypus it remains to specify some points of difference between the cell aggregations of the latter and the cell *masses* of the malignant family of sarcomata. It is mainly a distinction between locally limited and hence innocent endothelial or connective tissue proliferation in the one case and rapid proliferation *with infiltration* in the other. In the confined space of a discrete tumour-formation, such as a bleeding polypus, we should scarcely expect to find malignant infiltration into its tissues. The cellulo-capillary aggregations of the innocent growth I so designate because by careful inspection they can be resolved without difficulty into what is mainly a highly cellular capillo-vascular tissue. The minute channels that enter into their composition are rarely formed of more than two or three endothelial cells in apposition, and in a given section they are cut at various planes and angles and vary in appearance owing to their tortuous course. Growth and proliferation outside the walls of the capillaries within the confined space also tend to cause compression, so that many of the lumina are collapsed. In denser areas where the cells are more abundant their heterogeneous disposition in relation to each other serves as a valuable mark of distinction from malignant cell masses, the elements of which are placed several abreast in juxtaposition, flat-wise, in one plane, an arrangement suggesting a mosaic. Except in the fusiform variety the cells of the angioma are often recognisable by their nuclei only, whereas in sarcoma the polygonal homogeneous cell body, inclosing a large dark nucleus (sometimes merging imperceptibly into a homogeneous cement-substance) is a common appearance. The nuclei of the endothelial and inter-capillary cells are often abnormally large in the angiomatous tissue (as is well seen in Fig. 12 between the chains of leucocytes), but they are nevertheless smaller than those of an endothelioma or small-cell sarcoma; lastly, the cellulo-capillary clusters are never walled off from each other by protective strands of fibrous tissue, engendered in some malignant growths as an attempt by nature to resist further incursion from infiltration. Figs. 14 and 15 are introduced in order better to illustrate these facts. In Fig. 14 a magnification of a cell-cluster from the same case as Fig. 9 shows well a com-

²² See Borst's Tumours, vol. i., 1902.

²³ General Pathology, p. 167.

parison between the disposition of the cells in the angioma and that in a malignant perithelioma (Fig. 15). In the latter the ill-defined vessels in the cell masses are just

FIG. 14.



Isolated areas of endothelioid cellulo-capillary proliferation in which a few lymphocytes are interspersed. From case No. 10. (Magnification 125 diameters.)

FIG. 15.



Isolated cell masses from an endothelioma of the nasopharynx; proliferation into and away from the blood channels (perithelioma). (Magnification 125 diameters.)

perceptible, the proliferated endotheliomatous cells having the arrangement described. In Fig. 14 there is a heterogeneous disposition of the cells and the density of the cluster is considerably augmented by the interspersion of

leucocytes. The cell nuclei are not more than half as large and the character of the surrounding stroma is in strong contrast with that in Fig. 15. Whether under a low power we take a general survey of the tissue, or under higher magnification scrutinise the cell structures individually, we find points of differential diagnosis between the septal angiomas and malignant growths, however difficult the diagnosis from malignancy may be in other growths in various regions of the body. I have dwelt especially upon a few only of these points; a perusal of the magnificent coloured drawings in Borst's Lehrbuch and a careful examination of microscopical sections will render obvious many more.

PART IV.—GENERAL PATHOLOGICAL CONSIDERATIONS
AND CONCLUSION.

It is in the pathology of these growths that so much interest has been excited not only on account of their strange variability in point of histological detail but, as I hope to have shown, on account, too, of their structural affinities to other morbid growths of still greater importance affecting the upper respiratory tract. In the unsettled state of many questions at present surrounding the subject, and in the absence of more precise etiological data, opinions are still divided as to whether a genuine and satisfactory species can be formulated under the generic title, Bleeding Polypus of the Septum. I think myself that a sufficient number of essential characters unite the *large majority* of recorded cases to render this possible and I am glad to find that Roth favours this view. Difficulties will always present themselves in the classification of atypical examples and we are hindered by a want of definite information as to a sequential relationship between the varieties which, from our knowledge of tissue developments, we may assume to be possible. The most comprehensive table yet published is Hasslauer's (18), enumerating 55 cases, but this is capable of considerable augmentation by other cases that have escaped his notice as well as by more recent records. Such a collection of angiomaticous neoplasms under a common title argues rather forcibly in favour of the establishment of a species, at least pending further elaboration. Hasslauer's list absorbs two from my own table—namely, Dr. StClair Thomson's and Dr. Scanes Spicer's first cases, and out of his 55, 22 are tabulated as bleeding polypus of the septum simply, with no other morphological qualification. Amongst the latter are included a case of Dr. Bond's but not Dr. Scanes Spicer's nor Dr. StClair Thomson's (14) later cases, which have an equal claim with the former to be so included. The remainder in Hasslauer's list, with one exception, are described as some form of benign angioma, examples of which it will be instructive here to quote. Fibro-angioma cavernosum—Walliczek (16). Angioma cavernosum—Brieger. Fibroma teleangiectodes—Lubliner (13). Myxoma teleangiectatica—Luc (5). Angioma cavernosum verum—Biehl. Fibroma molle teleangiectodes—Baurowicz. Angioma—Jurasz and others. Cavernous tumour—Strazza (11). Myxo-angioma—Garel (9); Egger. Fibro-angioma—Freudenthal and others. Fibro-cartilaginous cellular teleangiectatic tumour—Noquet. Erectile tumour—Mackenzie (Verneuil). The exception alluded to

is a pendulous fibroma (Suchanek's). If we add to Hasslauer's 55 cases seven of Krieg's, two of Gerber's, five from other German sources, and 14 from my table we arrive at a total of some 83 cases comprisable under one title, apart from the number—doubtless very considerable—that have failed to be recorded. Hasslauer regarded the atypical case above mentioned as worthy of inclusion in his list, whilst virtuously excluding all such as were deemed from their pathological reports to be tainted with malignancy; he also excludes growths morphologically indistinguishable which have been removed from the floor or outer wall of the vestibule. Nevertheless certain German observers refuse to give these growths a special place in rhinology. Fraenkel and Alexander (18), Chiari (24), Grünwald, and Siebenmann, who, I believe, regard them as granulomata, may be presumably cited as of the same opinion.

As already stated under the etiological section these growths may be supposed to commence existence as inflammatory formations due in a certain proportion of cases to either a traumatism or some undefined source of irritation. Upon a primary and possibly granulomatous substratum there may be assumed to follow, if the tumour is suffered to remain long enough *in situ*, certain changes, vascular obliteration by cross fibrous structure normal to the healing process failing to supervene. From the formative cells originally given off by the endothelial walls of the basal capillaries a stroma of fibrillary connective tissue is developed which may ultimately become fibromatous and œdematous but always angeiomatous in various degrees and combinations, spongy angeiomatous tissue being possibly a later transformation by dilatation of the capillaries. Spongy angeiomatous tissue, fibro-angeiomatous structure, and dilated blood spaces are all typified in granulation tissue of one kind or another. The factor determining each peculiar form of metamorphosis in the walls of the capillaries and blood spaces of the fundamental tissue is matter for conjecture; rapid proliferation of the newly formed vascular tissue somewhat like that occurring in capillary nævus seems to become the characteristic of one case, whereas large blood-cavity formation is conspicuous in another. We may infer that the latter is an early development when occurring in the pedicle or base. At a much later stage, instead of by simple dilatation, many of the large irregular sinuses appear to have been formed by the confluence of neighbouring spaces whose attenuated walls have given way before the force or wear and tear of the blood current. The supposition that granulomatous tissue always forms the substructure upon which the angeiomatous growth is subsequently developed receives rather less support from an examination of the basal structures or from the older portions more remote from the pedicle in some examples. It is in the peripheral and presumably more recent areas of growth that the

granulomatous tissue is commonly observed, and, as the histological descriptions in the table show, this tissue is almost invariably in association with a surface in which the epithelium has disappeared or has been replaced by blood plasma or fibrinous material. I have had some interesting conversation with Mr. Shattock as to the correct interpretation of this fact and we have come to the conclusion that the granulation tissue is the result of inflammation excited by an infective process attacking a portion of the circumference. An invasion by micro-organisms through an abrasion would excite inflammatory reaction in the parts beneath, giving rise to the coagulable exudation containing leucocytes of various kinds so commonly observed. This effusion would push up the epithelium and cause the shedding or desquamation of its component cells. Some explanation is thus afforded of the not infrequent occurrence of ulceration and of the peculiar mixing up of coagulum and epithelium such as is described in Case 14, in which epithelial cells or leucocytes containing micro-organisms are visible *in situ*. The loosened epithelial cells seem to be disintegrated and absorbed by the polymorphonuclear leucocytes (or phagocytes) of the fibrinous exudation in which they are enveloped. The indefinite specimen (Case 9) shows evidence of a history of causation by some such infective process following injury in a subject whose surroundings would be favourable. Whether it is owing to the occurrence of these sites of inflammatory reaction that the title of "granuloma" has been suggested as a suitable denomination for the entire series I am not aware. As regards the various forms of circumvascular cell proliferation, which with the dilated vessels is so characteristic a feature of the commonest types of bleeding polypus, serving to distinguish them so readily from the non-angiomatous nasal growths, there seems no plausible *raison d'être*. I have been inclined to regard the perisinuous proliferations as a kind of abortive attempt to choke up and obliterate the spaces, the fibro-angiomatous meshwork being a possible late result, but no trace of a completed fabric of scar tissue is anywhere to be seen, and in any case the cellulo-capillary agglomerations would still remain unaccounted for.

In concluding this paper I have to regret the non-elucidation of many absorbing problems that are broached within it but I have written for the rhinologist and the practitioner interested in rhinal pathology rather than for the professed pathologist. Nevertheless, for the future advancement of the subject I would offer the following suggestions. Firstly, in every case of bleeding polypus to examine the patient carefully for evidence of rhinitis sicca or any trace of inflammatory processes in the septum, failing which to inquire for any possible source of local irritation or traumatism or history of simple ulceration, epistaxis, or perforation. To look for the presence of pulsation and care-

fully note the colour of the surface, whether bright or dark red indicating arterial or venous blood-supply.

In removing the growth it is desirable to preserve as much of the pedicle as possible, if such there be, or at any rate of the base. In the preparation for the microscope directions should be given to harden the specimen gradually in spirit, completing in pure alcohol and avoiding formalin. Embedding in paraffin has many advantages but many specimens are ruined by over-heating or "cooking," and the damage thus caused by shrinkage of the tissues and cell elements is irreparable. The principal section should be made vertical to the pedicle or base; any spare material—i.e., the unused half—should be cut in the opposite plane. As regards the stains to be used, hæmatoxyline and eosine are, in my estimation, more suitable than van Giessen for this particular tissue, they are familiar to everybody and bring out all essential points extremely well. On the whole, it is, perhaps, better to employ both these stains in two separate sections respectively. When ulceration or fibrinous exudation is present a separate section may be stained for micro-organisms.

Finally, the pleasing duty remains of expressing my obligations to those gentlemen who have kindly placed at my disposal their microscopical collections for the study of various neoplasms, innocent and malignant, bearing upon the subject of this paper. To Mr. Shattock and Dr. Lazarus-Barlow for this facility, and for the enjoyment of many discussions upon the histology of bleeding polypus of the septum and its allies, my thanks are especially due. The latter gentleman has kindly looked over the proofs with me. I wish also to include the names of Dr. H. D. Rolleston and Dr. R. S. Trevor of St. George's Hospital for access to their valuable collections. To those members of the Laryngological Society of London who have contributed specimens to the cabinet of the society or have lent slides to me from their private collections for examination and for reproduction by the artist I wish to accord my warmest thanks; their names are duly recorded in connexion with their cases in the table, and the illustrations in the text. With regard to these, the excellence of the artist's (Mrs. Taylor's) work speaks for itself, and I wish to express my indebtedness to the Editors of THE LANCET for their liberality in displaying them.

BIBLIOGRAPHICAL REFERENCES AND COMMENTS.

(1) Verneuil: *Annales des Maladies de l'Oreille*, 1875, quoted by Morell Mackenzie, vol. ii., p. 384. (2) Roe: *Transactions of the American Medical Society*, 1885. Classical Essay on "Nasal Angeliomata," with table of 14 cases. Three or perhaps four of these can be recognised as falling into the category of bleeding polypus of the septum. (It can be consulted in the library of the British Museum.) (3) Moure: *Manuel Pratique des Maladies de Fosses Nasales*, 1886. It contains a short chapter, excellent for the time of writing, on erectile tumours; it is influenced by Verneuil's paper. (4) Victor Lange: *Copenhagen, Wiener Medicinische Presse*, No. 52, 1892. A paper now historical, much quoted by German writers; it contains a narration of six cases and attempts to establish a preference of bleeding tumours for the left side of the septum. Of 17 cases within my knowledge 12 grew on the left side, five on the right. According to Hasslauer, Lange has the credit for the earliest description of these growths, "though Tsakyrogious (*Monatsschrift für Ohrenheilkunde*, 1887) has described one but not interpreted as such." (5) Luc: *International Centralblatt für Laryngologie*, 1892, S. 9; a description of a teleangiectatic myxangioma. (6) Schadowaldt: *Archiv für Laryngologie*, 1893, Band I. Three cases, here first designated "Blutende Septum Polyp," described in a paper before the Laryngological Society at Berlin, July 14th, 1893. (7) Alexander: *Archiv für Laryngologie*, Band I., 1893. Alexander, Scheier, and Heymann, and Schwäger each published cases of Bleeding Tumours of the Septum; and Schwäger six cases of Angelioma of the Nasal Mucous Membrane (inferior turbinal) in this volume of the Archives. (8) Natier: *Annales de Polyclinic de Paris*, 1893: "Trois cas de Polypes saignants de la Cloison." I regret not being able to see this paper. (9) Garel: *Annales des Maladies de l'Oreille*, February, 1893. A case of "true angelioma." (10) Cobb: *Boston Medical and Surgical Journal*, 1893; and *Transactions of the Pan-American Congress*, vol. xxx., 1895. A genuine case described at the Congress in 1893 as Cavernous Angelioma of the Septum. Cobb gives many valuable references to past literature in this paper. (11) Strazza: *Revue Internationale de Laryngologie*, March, 1894, described a case of cavernous angelioma. (11a) Seifert and Kahn: *Atlas der Histopathologie der Nase*, 1895, figuring a fibro-angelioma from the middle turbinal, a cavernous angelioma from the inferior turbinal, and a bleeding polypus of the septum, with descriptive text. (12) Sendziak: *Kronica lek.*, 1895, translated in the *Journal of Laryngology*, March, 1896; important description of a case with valuable references but apparently uninfluenced by the German literature of 1893 and 1894. (13) Lubliner: "Medicina," 1894; a description of a "fibroma telangiectodes." (14) StClair Thomson: *Proceedings of the Laryngological Society of London*, vol. iii., January, 1896. This was the first case described in the proceedings of the society; it was followed in November of the same year by a case of Dr. J. W. Bond's; the remaining cases will be found in sequence in the table. (15) Glasgow: *Journal of the American Laryngological Society*, 1897. Case of Angeliomafibroma of the Septum, described and figured by C. Fisch; the structure of the arterial system is stated to be "throughout normal," which does not accord with the usual experience. (16) Walliczek: *Monatsschrift für Ohrenheilkunde*, 1897. I only know this paper, in which the classification detailed in the text originated, through Roth's reference. (17) Pearce, Norval H.: *Journal of the American Medical Association*, February, 1898. An account of two cases in patients aged respectively five and 15 years, followed by an interesting discussion. (18) Hasslauer: *Archiv für Laryngologie*, 1900. Innocent Tumours of the Nasal Septum; Section III., Bleeding Polypus, with table of 55 cases; the first comprehensive paper of its kind that I am acquainted with, and to which further references

will be found. (18a) Heymann: Handbuch der Rhin., Band iii., 1900. (19) Shurley: Diseases of the Nose and Throat, 1900. An observation is made in this treatise (p. 537) under the description of nasal papillomata; which has arrested my attention, and not fully understanding it I refer to it here. Shurley says: "The soft or what is called by some the 'mulberry papilloma' or 'angioma' on the other hand is of very rapid growth and shows quite a tendency to spread. This is why some observers have considered it malignant. On account of their site, which is within the vestibule of the nose, Seiler and others have believed that the most common cause of their origin is external irritation." The author then gives a short description of "true angiomas or erectile tumours," of which he states that cases have been reported by Wagner, Glasgow (an angiofibroma), Delavan, Roe, Jarvis, and Casselberry; also that Seiler has collected the reports of ten cases. He also records that Dr. George Godson reported a case of false angioma due to a blood-clot as proved by microscopic examination, which afterwards underwent absorption. Shurley's illustration is a reproduction of Fisch's drawing of Glasgow's case. I am indebted to Dr. Shurley for the above references. (20) Krieg: Atlas of Diseases of the Nose, 1901. Nine cases admirably illustrated macroscopically with excellent descriptions in the text. This atlas was shortly followed by Gerber's, in which two cases are figured and described. (21) Grünwald: Atlas of Diseases of the Mouth, Pharynx, and Nose, translated and edited by Newcomb, 1903. Bleeding polypus of the septum is mentioned under Granulomata (p. 165): If by round-cell tissue is meant lymphoid tissue my experience on this point, as well as others in this reference, does not accord with Dr. Grünwald's. (22) Reichert: Archiv für Laryngologie, Band iii., 1903. On a Case of Bleeding Polypus of the Septum. (23) Baurowicz: Archiv für Laryngologie, Band iii., 1903, p. 451. A short paper dealing with the Etiology and Clinical History of Bleeding Polypus. (24) Roth: Archiv für Laryngologie, Band xvi., Heft 3, 1904. On a case of Bleeding Tumour of the Septum from Professor Paltauf's Pathological Institute. A brochure which, like that of Hasslauer, will be found to be of great value to students of this subject. With but few exceptions this brief *résumé* indicates the authors of clinical papers only. As regards the text-books in the English language, the references to nasal angiomatous growths are somewhat meagre and many omit them altogether. In text-books on special pathology they are hardly ever alluded to. The Proceedings of the Laryngological Society are published by, and obtainable from, Messrs. Adlard, Bartholomew Close. They are also reproduced in the *Journal of Laryngology* after each meeting.

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